

CLAIMS

We claim:

1. A substantially non-discoloring sizing composition for reinforcing fiber materials, comprising:
an emulsion comprising a grafted polyolefin;
two or more saturated fatty acids; and
one or more silane coupling agents.
2. The sizing composition of claim 1, wherein the emulsion comprises an aqueous solvent.
3. The sizing composition of claim 1, wherein the grafted polyolefin comprises a homopolymer of polypropylene or a random copolymer of propylene and ethylene.
4. The sizing composition of claim 1, wherein the grafted polyolefin comprises a grafted portion selected from the group consisting of acid anhydride, carboxylic acid, hydroxyl, amino, amide, ester, isocyanate, double bonds, and epoxy.
5. The sizing composition of claim 1, wherein said sizing composition is without a color compensating additive.
6. The sizing composition of claim 1, wherein the grafted polyolefin has a level of grafting between about 0.05% to about 15% by weight based on the total weight of the grafted polyolefin.
7. The sizing composition of claim 1, wherein the saturated fatty acids contain a $C_8 - C_{36}$ saturated fatty acid.
8. The sizing composition of claim 1, wherein the saturated fatty acids comprise two or more saturated fatty acids selected from the group consisting of

myristic acid, palmitic acid, pentadecanoic acid, margeric acid, stearic acid, behenic acid, and sebacic acid.

9. The sizing composition of claim 1, wherein the saturated fatty acids comprise an aqueous mixture of palmitic acid, sebacic acid, and stearic acid.
10. The sizing composition of claim 1, wherein the emulsion comprises a grafted polyolefin comprising an aqueous emulsion of a polypropylene grafted with maleic anhydride.
11. The sizing composition of claim 1, wherein the silane coupling agent is an amino silane coupling agent.
12. The sizing composition of claim 1, further comprising an antifoaming agent.
13. The sizing composition of claim 1, having a viscosity of from about 8 cPs to about 150 cPs.
14. A fiber coated with the sizing composition of claim 1.
15. A composite comprising the fiber of claim 14.
16. A method of manufacturing a substantially non-discoloring reinforcing fiber material comprising:
 - a) preparing a sizing composition comprising an emulsion comprising a grafted polyolefin, two or more saturated fatty acids, and one or more silane coupling agents;
 - b) contacting a plurality of filaments of a reinforcing fiber material with the sizing composition; and
 - c) allowing the sizing composition to solidify on the surfaces of the plurality of filaments to form a substantially non-discoloring reinforcing fiber material.

17. The method of claim 16, wherein the step of contacting comprises contacting said filaments with the sizing composition immediately after they are continuously formed from a fiber-forming bushing.
18. A method of making a fiber-reinforced composite having minimal discoloration, comprising:
 - a) applying a substantially non-discoloring sizing composition comprising an emulsion comprising a grafted polyolefin, two or more saturated fatty acids, and one or more silane coupling agents on the surfaces of a reinforcing fiber material to form a sized reinforcing fiber material; and
 - b) compounding and molding the sized reinforcing fiber material with a matrix resin to form a fiber-reinforced composite having minimal discoloration.
19. The method of claim 18, wherein the matrix resin is selected from the group consisting of polyolefins, polyesters, polyamides, polyacrylamides, polyimides, polyethers, polyvinylethers, polystyrenes, polyoxides, polycarbonates, polysiloxanes, polysulfones, polyanhydrides, polyimines, epoxy, polyacrylics, polyvinylesters, polyurethane, maleic resins, urea resins, melamine resins, phenol resins, furan resins, polymer blends, alloys, and mixtures thereof.
20. The method of claim 18, wherein the step of compounding and molding the sized reinforcing fiber material is selected from extrusion molding, compression molding and injection molding.
21. The method of claim 18, wherein the composite further comprises a polyolefin as a matrix resin.

22. The method of claim 18, wherein the composite comprises a second coupling agent.